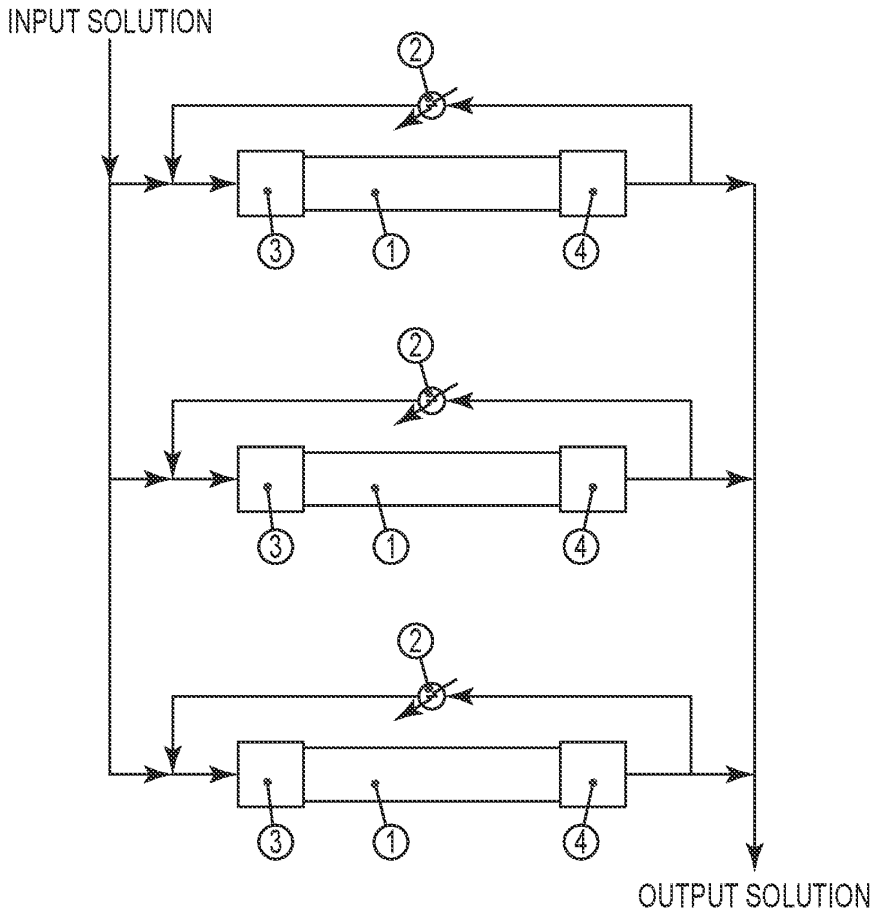


ITEM NO.	DESCRIPTION
1	PHOTOCHEMICAL REACTOR
2	RECYCLING/COOLING
3	SENSOR MODULE
4	PARTS FOR SAMPLING OR ADDING REAGENTS OR VENTING

Figure 1

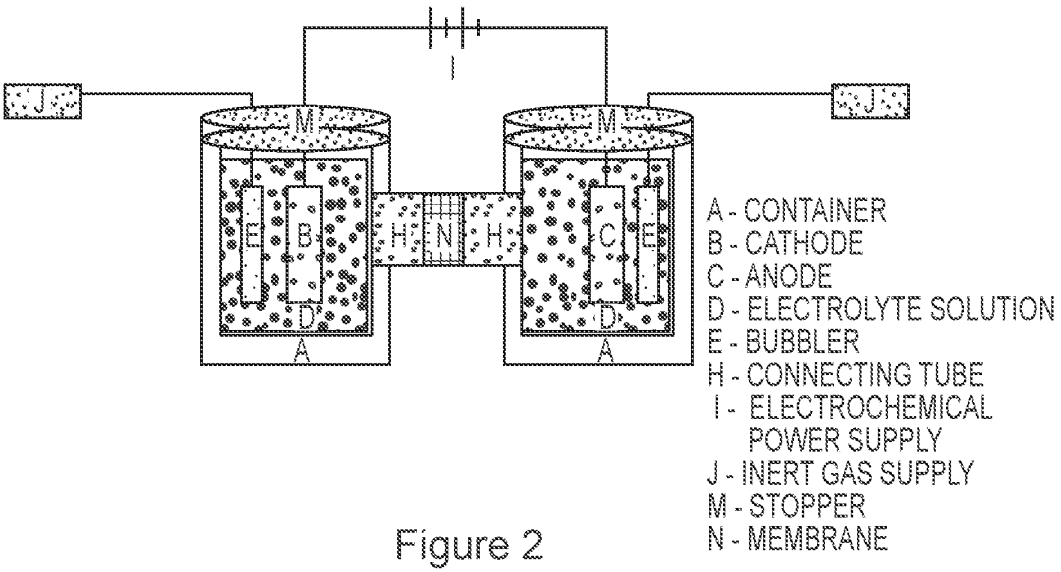


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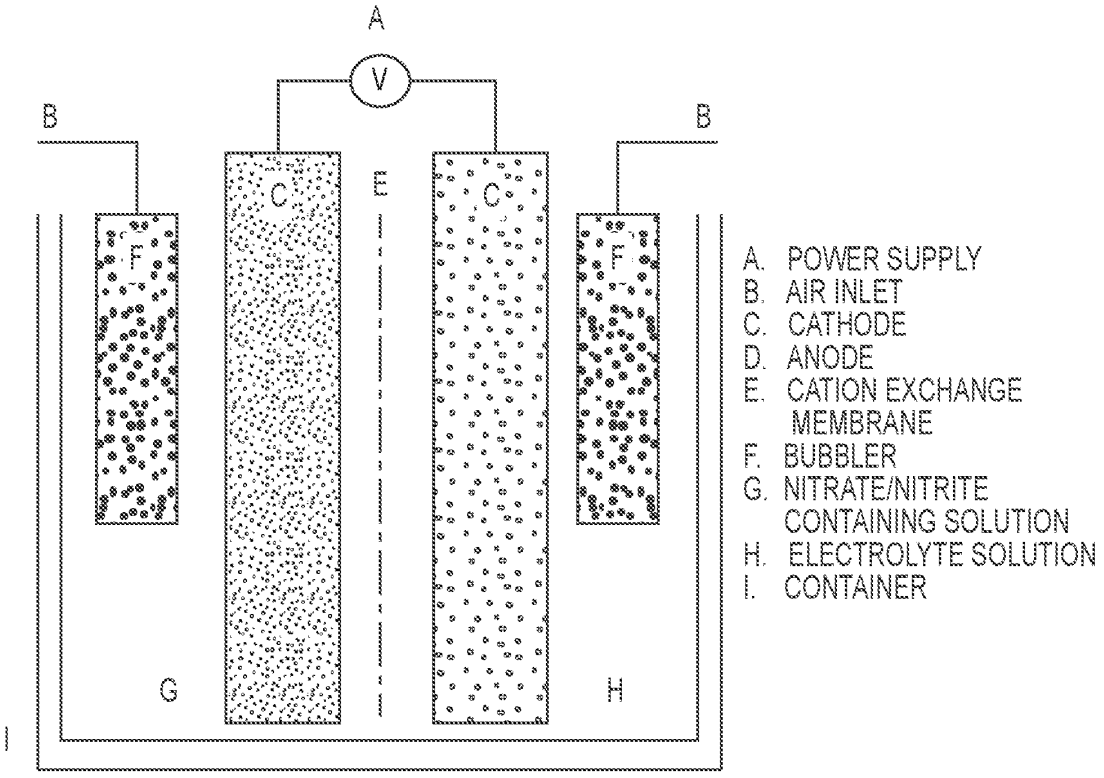


Figure 3

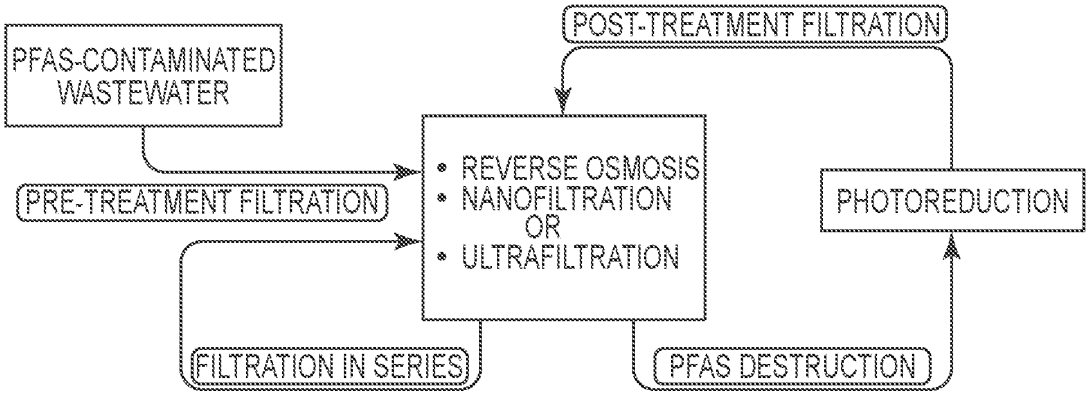

PFAS-CONTAMINATED WASTEWATER
POST-TREATMENT FILTRATION
PRE-TREATMENT FILTRATION
• REVERSE OSMOSIS
• NANOFILTRATION
OR
• ULTRAFILTRATION
PHOTOREDUCTION
FILTRATION IN SERIES
PFAS DESTRUCTION

Figure 4

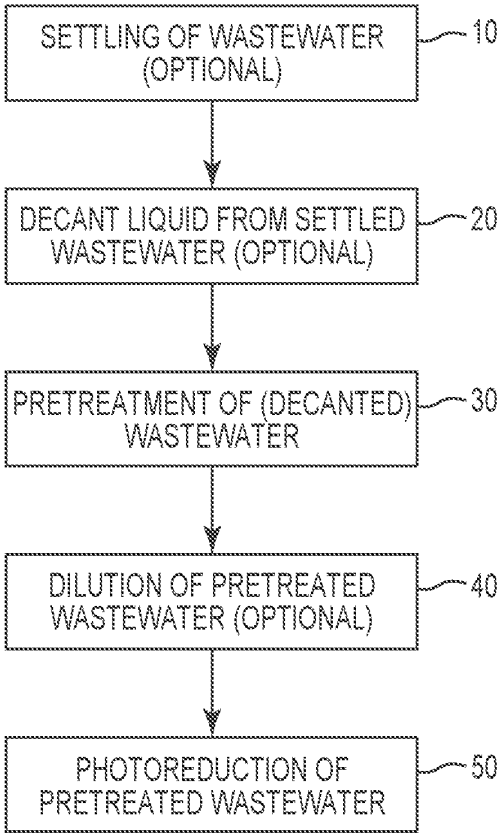

SETTLING OF WASTEWATER (OPTIONAL)
10
DECANT LIQUID FROM SETTLED WASTEWATER (OPTIONAL)
20
PRETREATMENT OF (DECANTED) WASTEWATER
30
DILUTION OF PRETREATED WASTEWATER (OPTIONAL)
40
PHOTOREDUCTION OF PRETREATED WASTEWATER
50

Figure 5

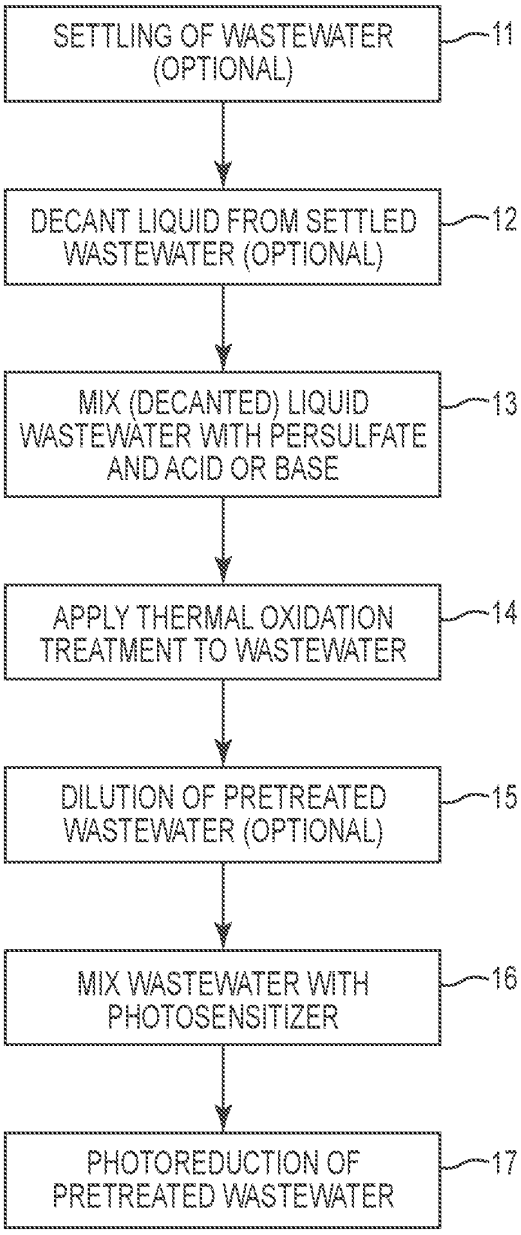

SETTLING OF WASTEWATER (OPTIONAL)
11
DECANT LIQUID FROM SETTLED WASTEWATER (OPTIONAL)
12
MIX (DECANTED) LIQUID WASTEWATER WITH PERSULFATE AND ACID OR BASE
13
APPLY THERMAL OXIDATION TREATMENT TO WASTEWATER
14
DILUTION OF PRETREATED WASTEWATER (OPTIONAL)
15
MIX WASTEWATER WITH PHOTOSENSITIZER
16
PHOTOREDUCTION OF PRETREATED WASTEWATER
17

Figure 6

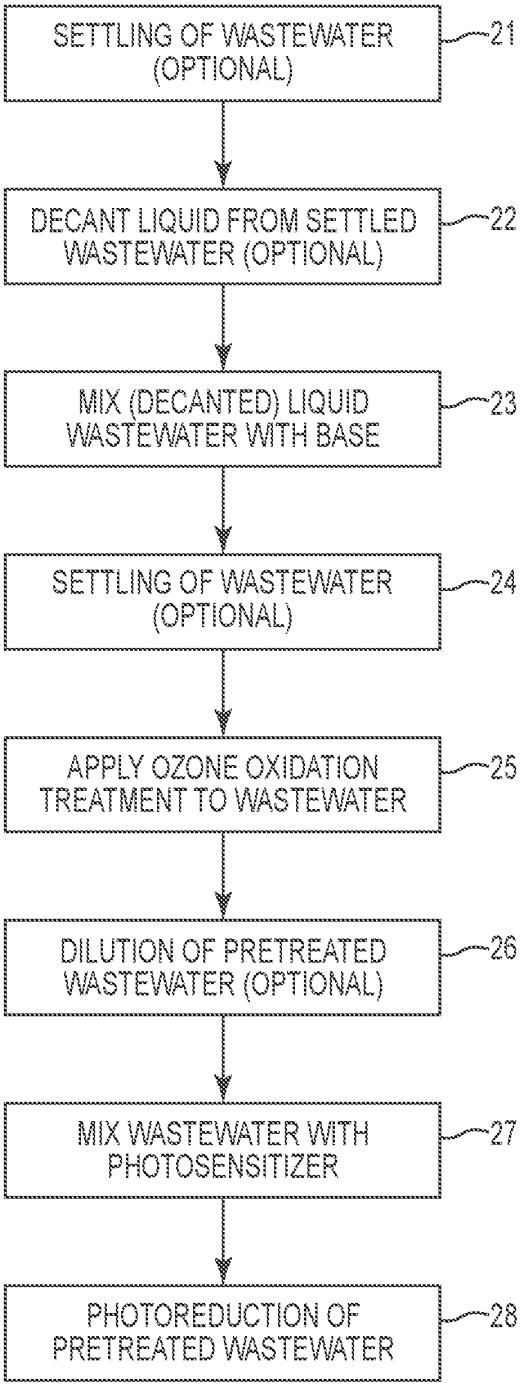

SETTLING OF WASTEWATER (OPTIONAL)
21
DECANT LIQUID FROM SETTLED WASTEWATER (OPTIONAL)
22
MIX (DECANTED) LIQUID WASTEWATER WITH BASE
23
SETTLING OF WASTEWATER (OPTIONAL)
24
APPLY OZONE OXIDATION TREATMENT TO WASTEWATER
25
DILUTION OF PRETREATED WASTEWATER (OPTIONAL)
26
MIX WASTEWATER WITH PHOTOSENSITIZER
27
PHOTOREDUCTION OF PRETREATED WASTEWATER
28

Figure 7

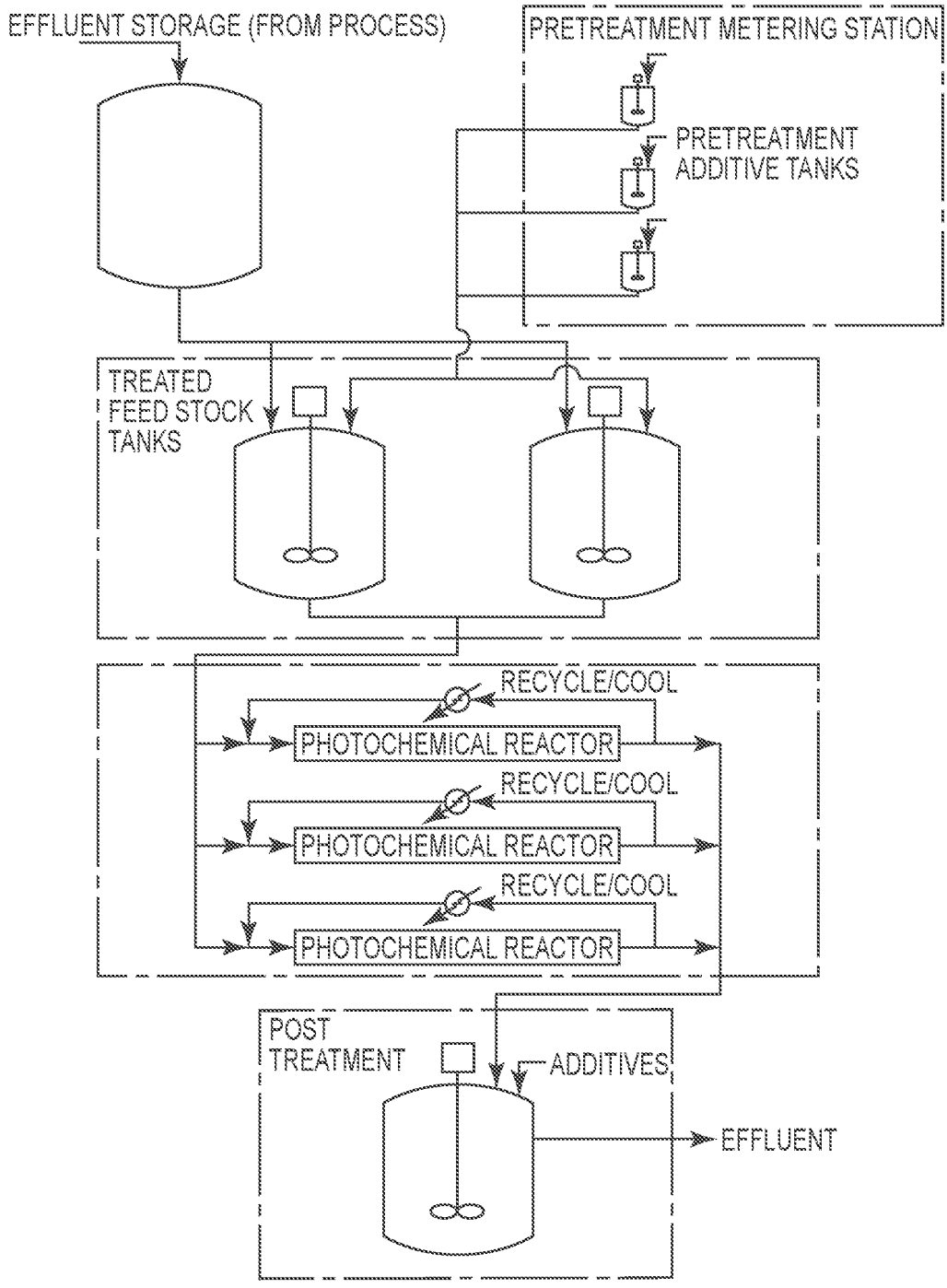

EFFLUENT STORAGE (FROM PROCESS)
PRETREATMENT METERING STATION
PRETREATMENT ADDITIVE TANKS
TREATED FEED STOCK TANKS
RECYCLE/COOL
PHOTOCHEMICAL REACTOR
RECYCLE/COOL
PHOTOCHEMICAL REACTOR
RECYCLE/COOL
PHOTOCHEMICAL REACTOR
POST TREATMENT
ADDITIVES
EFFLUENT

Figure 8

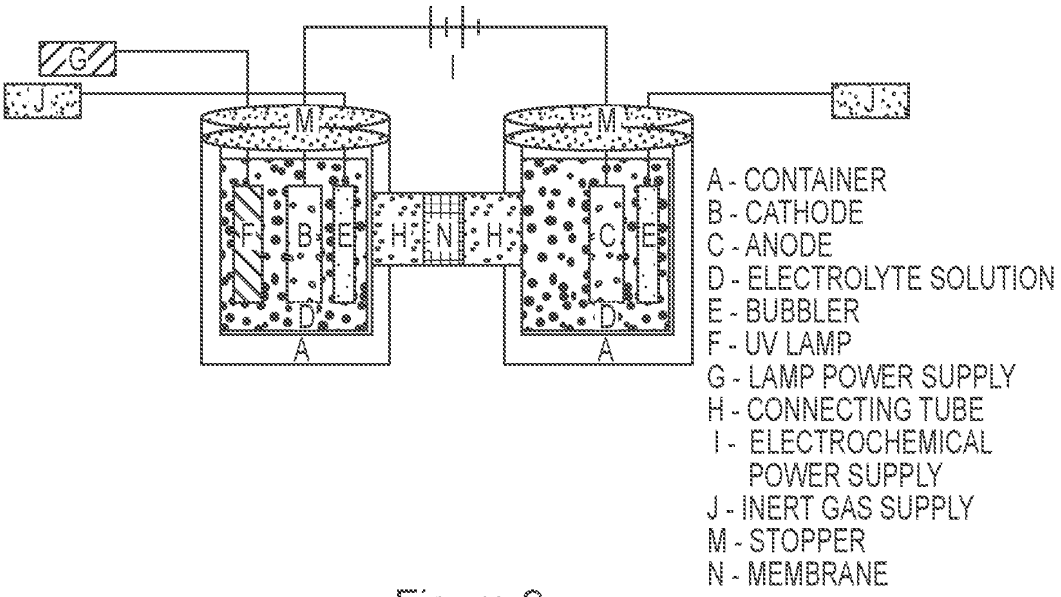


Figure 9

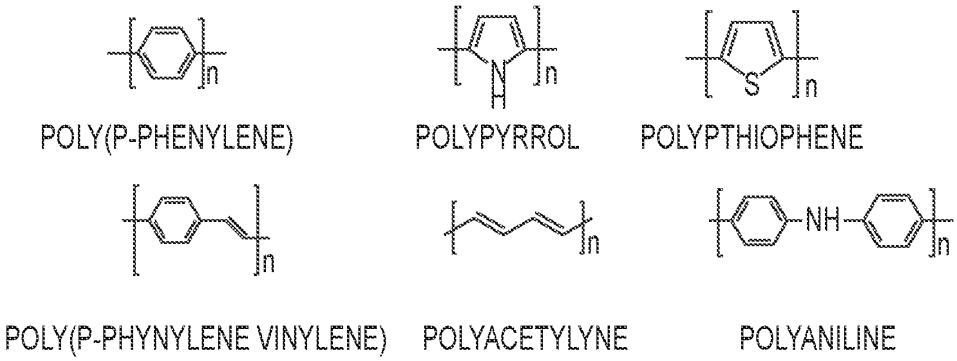
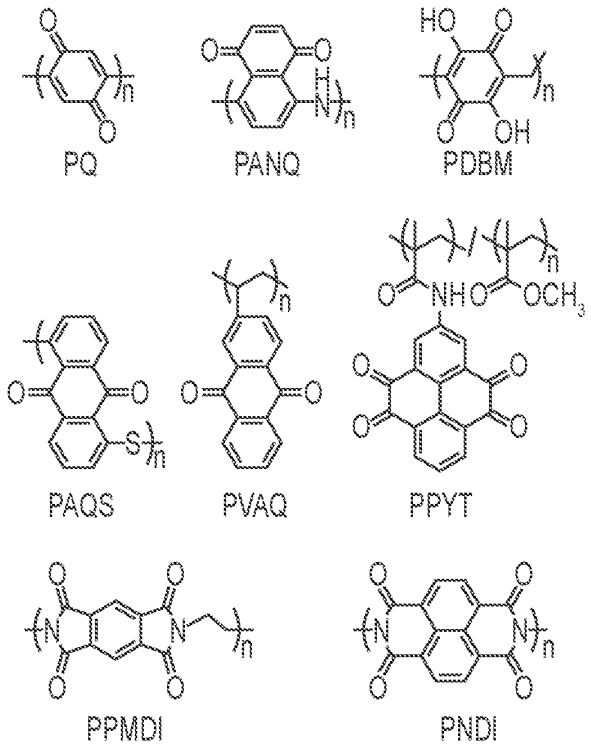
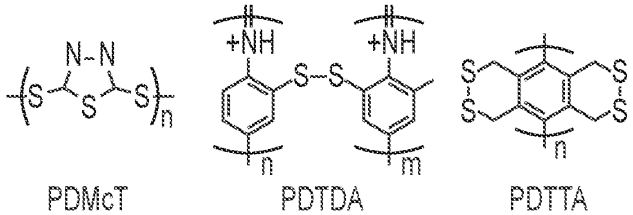


Figure 10



N-TYPE POLYMERIC MATERIALS BASED ON CONJUGATED CARBONYL GROUPS: POLYMERIC QUINONE (PQ), POLY(5-AMINO-1,4-NAPHTHOQUINONE) (PANQ), POLY (2,5-DIHYDROXY-1,4-BENZOQUINONE-3,6-METHYLENE (PDBM), POLY(ANTHRAQUINONYL SULFIDE) (PAQS), POLY(2-VINYLANTHRAQUINONE) (PVAQ), POLYMER-BOND PYRENE -4,5,9,10-TETRAONE (PPYT), POLYMERIC PYROMELLITIC DIIMIDE (PPMDI) AND POLYMERIC NAPHTHALENE DIIMIDE (PNDI).

Figure 11



TYPICAL ORGANODISULFIDES AND THEIR THEORETICAL CAPACITY: POLY(2,5-DIMERCAPTO -1,3,4-THIADIAZOLE) (PDMcT), POLY(2,20-DITHIODIANILINE) (PDTDA), POLY(5,8-DIHYDRO-1H, 4H-2,3,6,7-TETRATHIA-ANTHRACENE) (PDTTA)

Figure 12

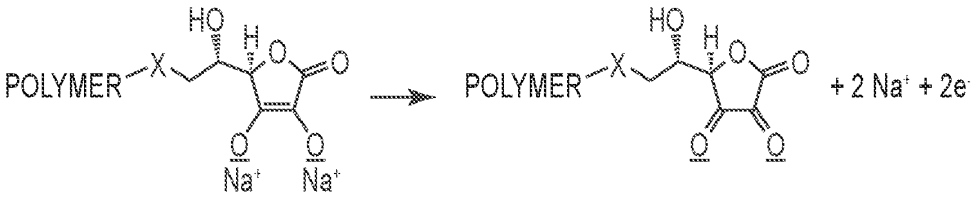


Figure 13

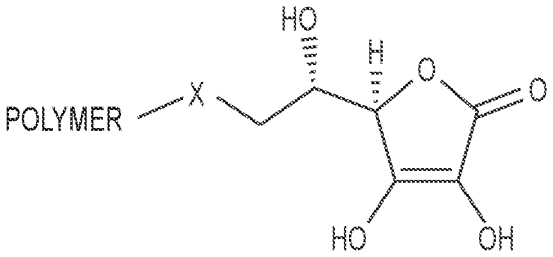
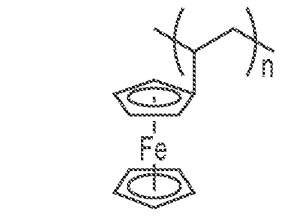


Figure 14



POLY(VINYLFERROCENE)

Figure 15

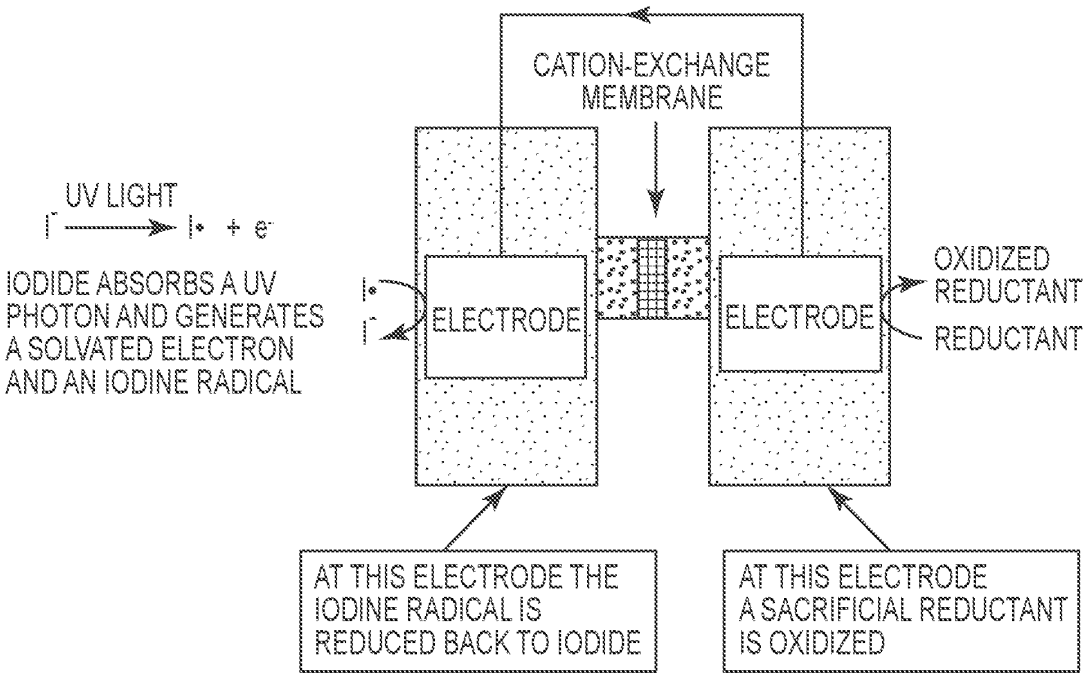


Figure 16

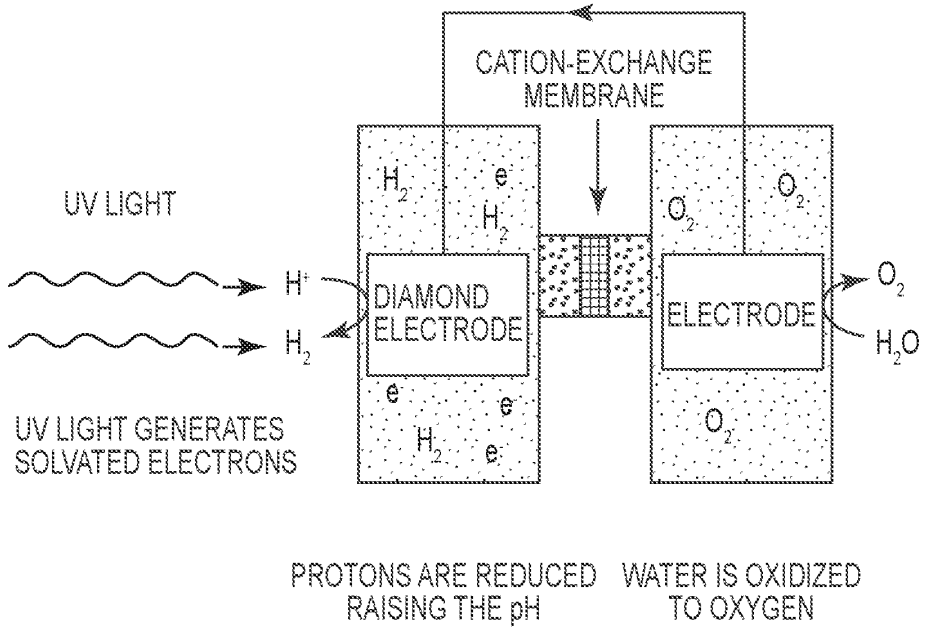


Figure 17

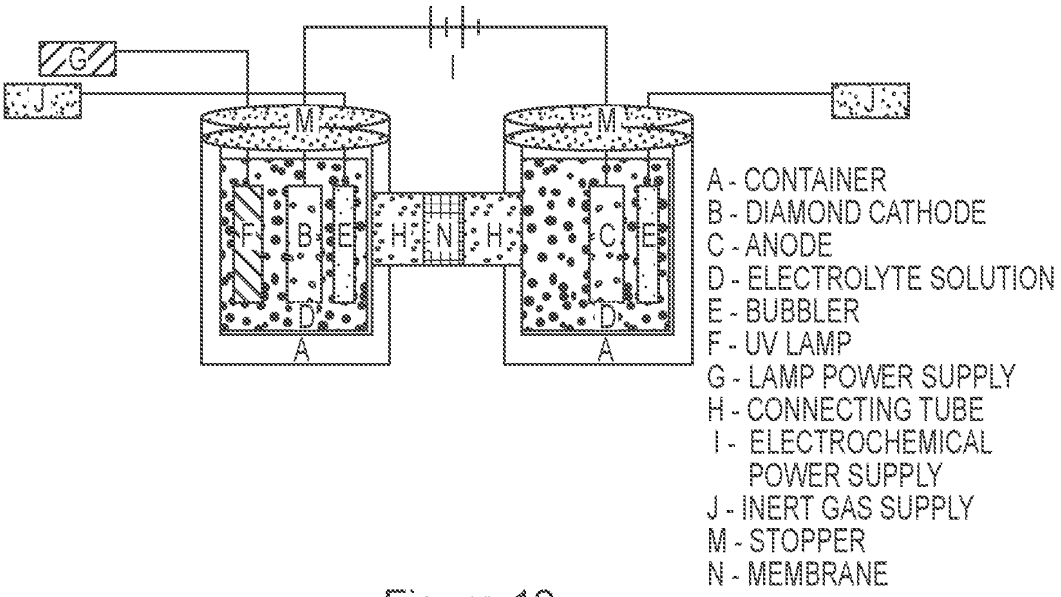


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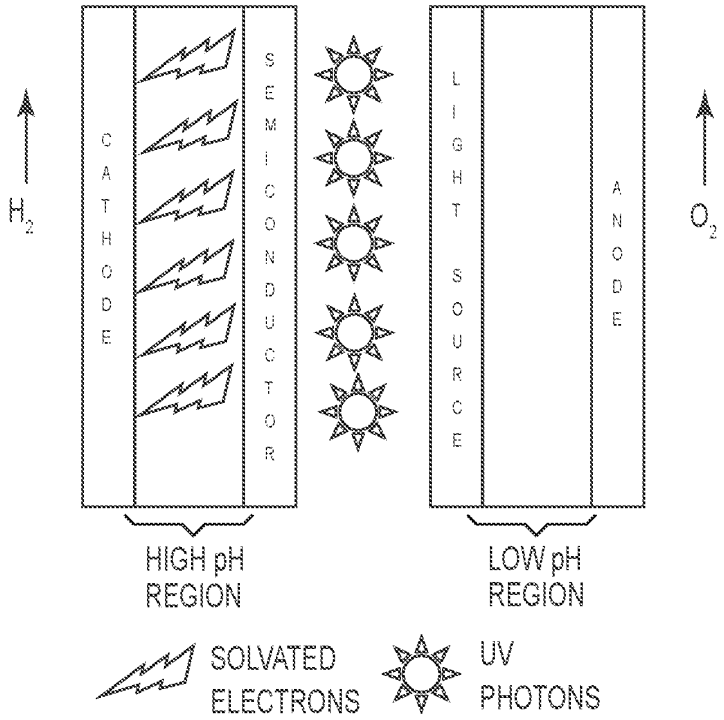


Figure 19

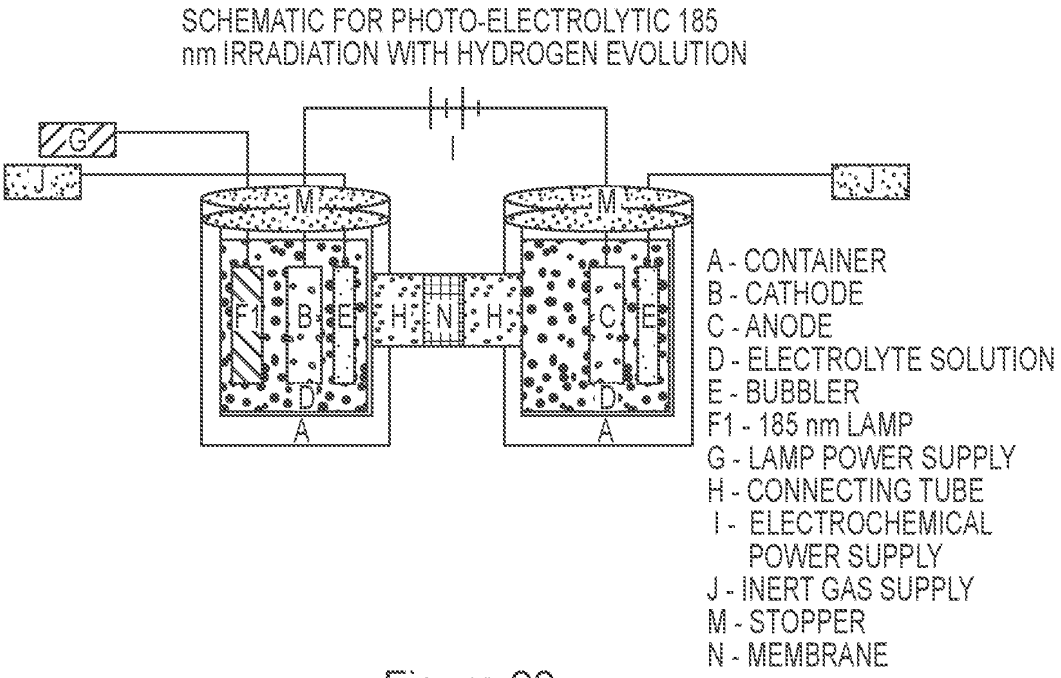


Figure 20

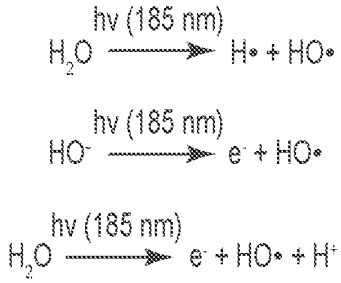


Figure 21

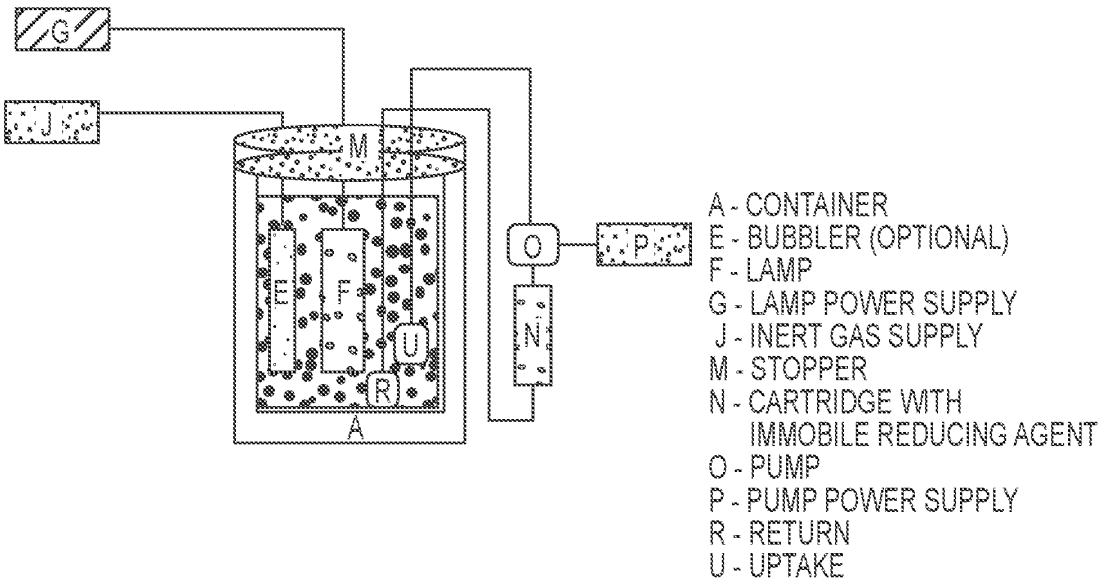


Figure 22

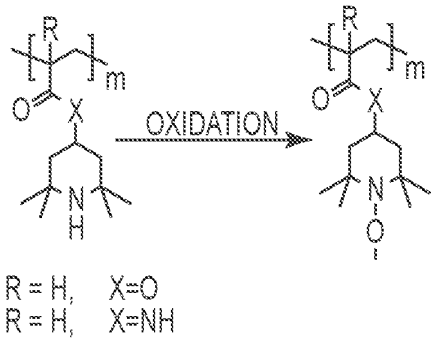
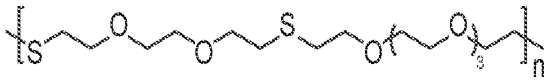
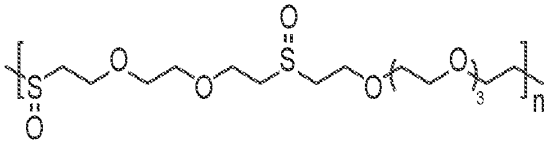


Figure 23



POLY (ETHER-THIOETHER)



POLY (ETHER SULFONE)

Figure 24

AROMATIC COMPOUND (ArC) + ELECTRON → AROMATIC ANION (ArC^-)
ArC^- + LIGHT → AROMATIC ANION EXCITED STATE (ArC^{-*})

AROMATIC COMPOUND (ArC) - ELECTRON → AROMATIC CATION (ArC^+)
ArC^+ + LIGHT → AROMATIC CATION EXCITED STATE (ArC^{+*})

Figure 25

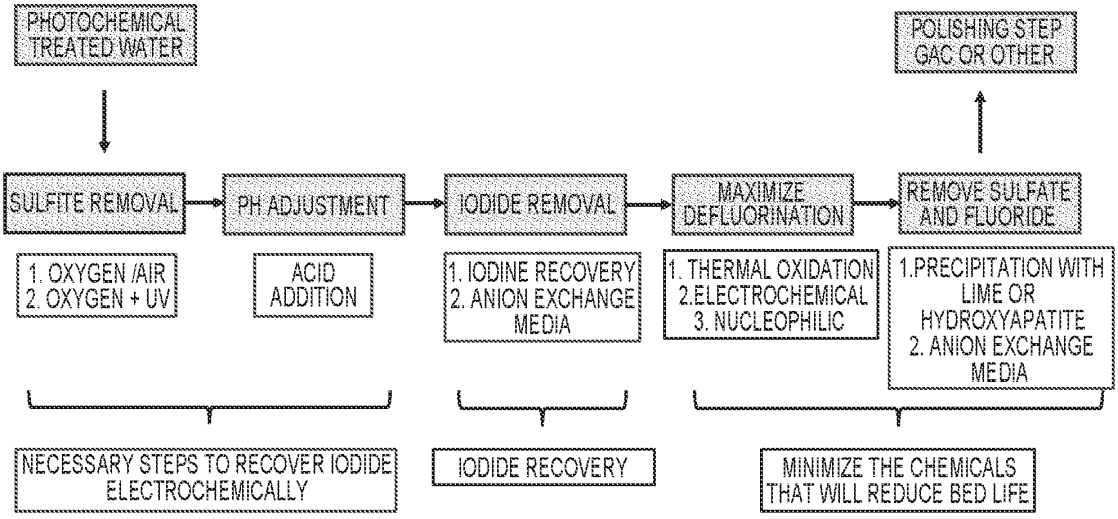


Figure 26

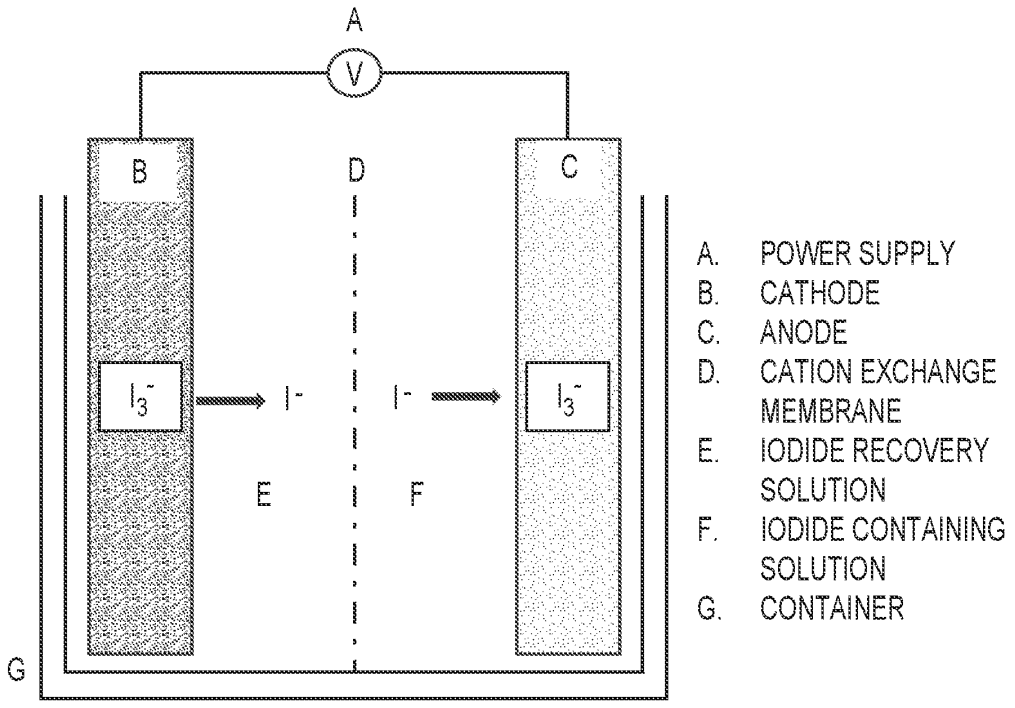


Figure 27

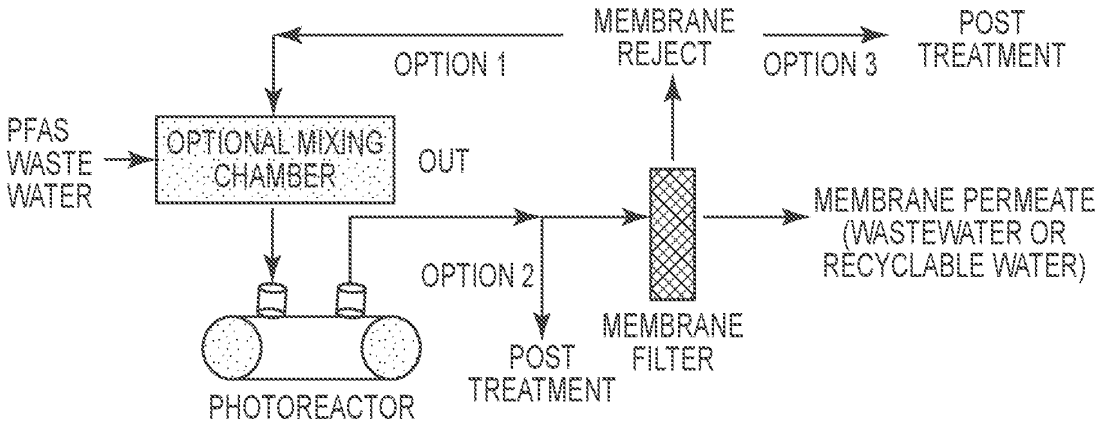

MEMBRANE
REJECT
POST
TREATMENT
OPTION 1
OPTION 3
PFAS
WASTE
WATER
OPTIONAL MIXING
CHAMBER
OUT
MEMBRANE PERMEATE
(WASTEWATER OR
RECYCLABLE WATER)
OPTION 2
MEMBRANE
FILTER
POST
TREATMENT
PHOTOREACTOR

Figure 28

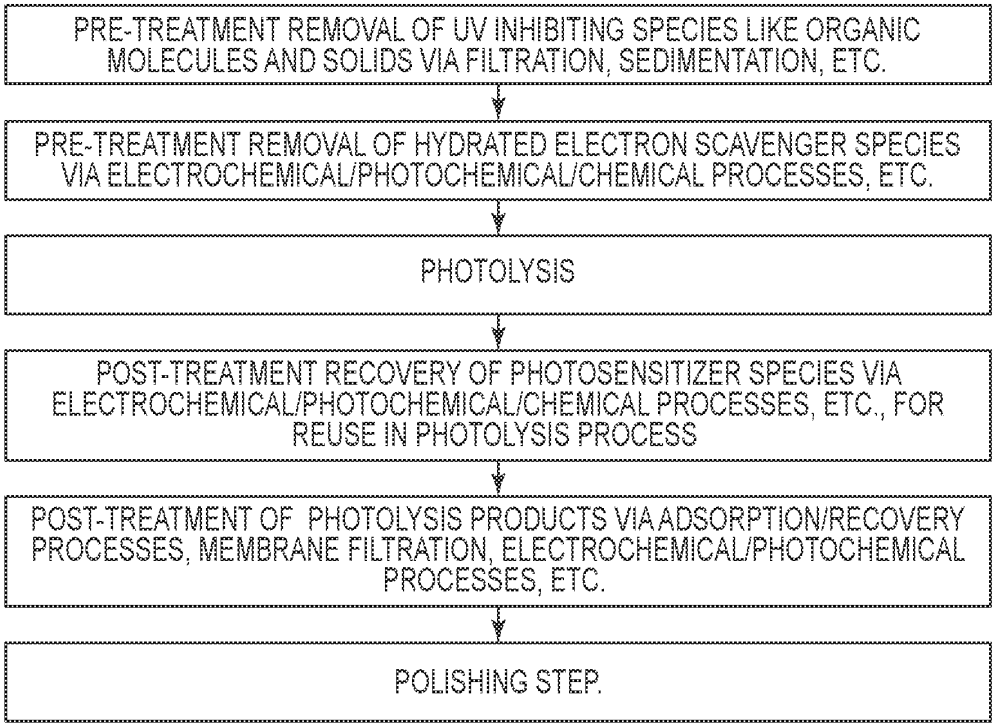

PRE-TREATMENT REMOVAL OF UV INHIBITING SPECIES LIKE ORGANIC MOLECULES AND SOLIDS VIA FILTRATION, SEDIMENTATION, ETC.
PRE-TREATMENT REMOVAL OF HYDRATED ELECTRON SCAVENGER SPECIES VIA ELECTROCHEMICAL/PHOTOCHEMICAL/CHEMICAL PROCESSES, ETC.
PHOTOLYSIS
POST-TREATMENT RECOVERY OF PHOTOSENSITIZER SPECIES VIA ELECTROCHEMICAL/PHOTOCHEMICAL/CHEMICAL PROCESSES, ETC., FOR REUSE IN PHOTOLYSIS PROCESS
POST-TREATMENT OF PHOTOLYSIS PRODUCTS VIA ADSORPTION/RECOVERY PROCESSES, MEMBRANE FILTRATION, ELECTROCHEMICAL/PHOTOCHEMICAL PROCESSES, ETC.
POLISHING STEP.

Figure 29

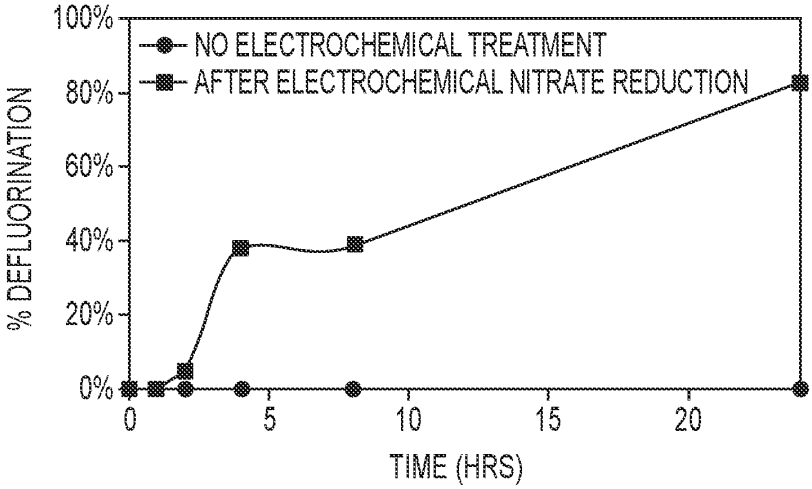


Figure 30

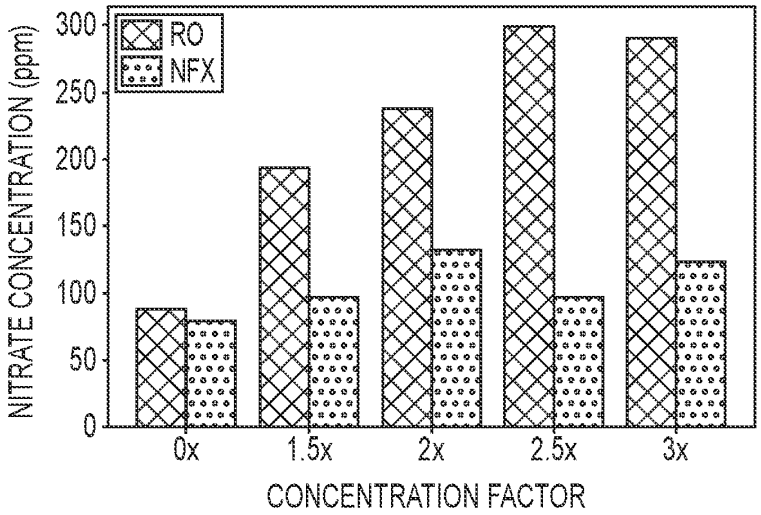


Figure 31

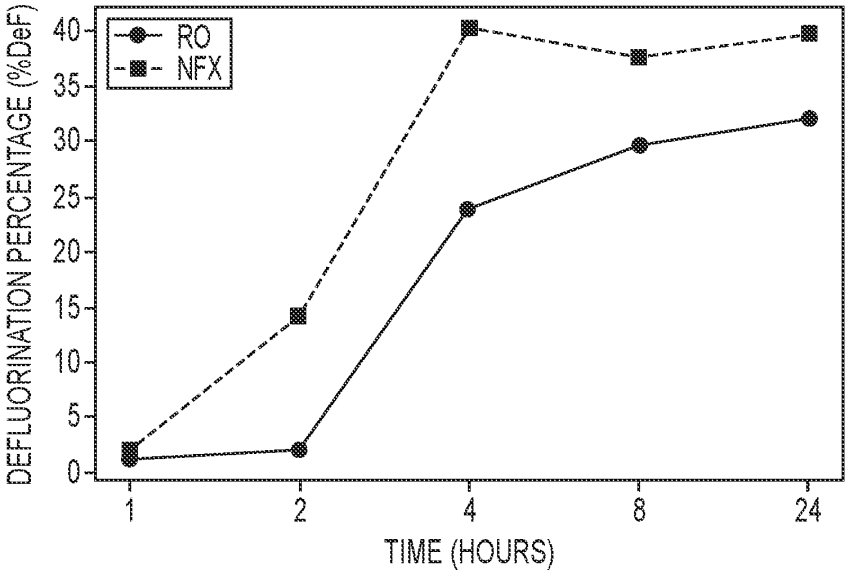


Figure 32

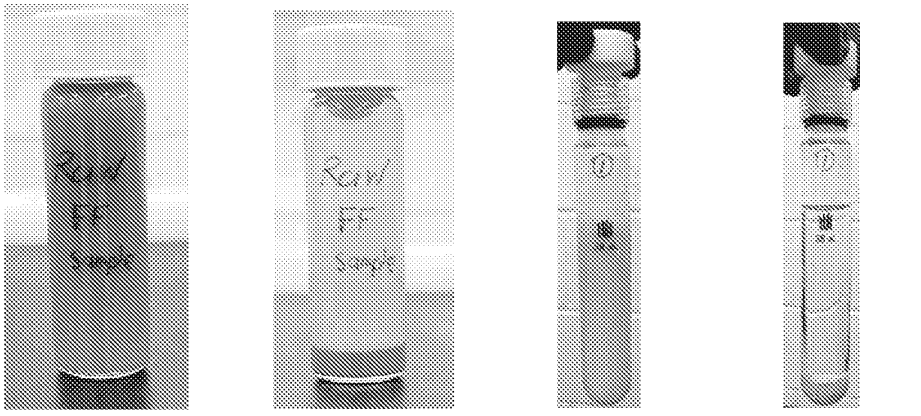


Figure 33

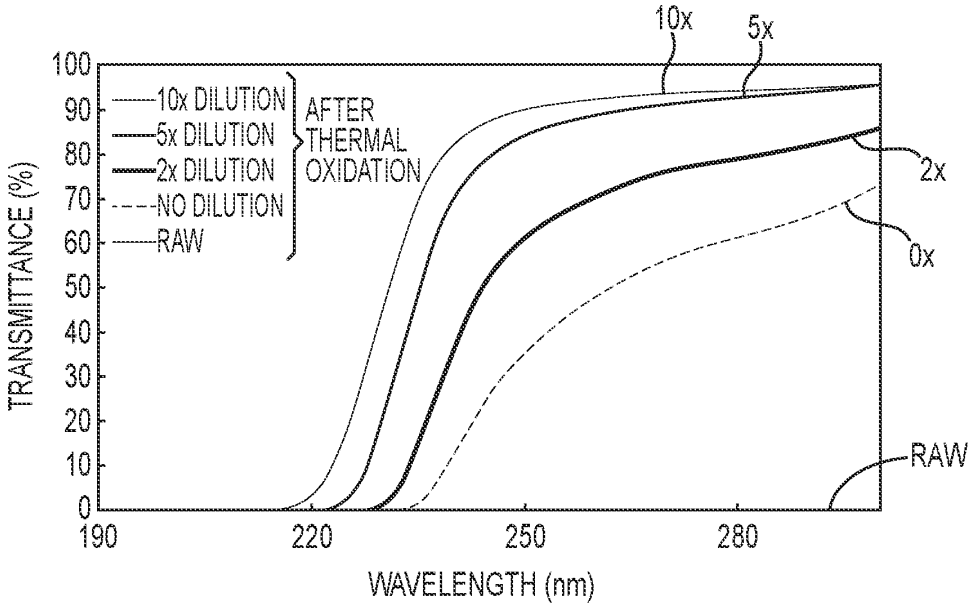


Figure 34

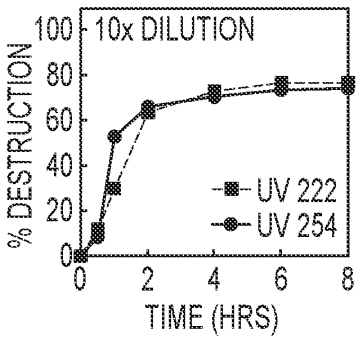


Figure 35a

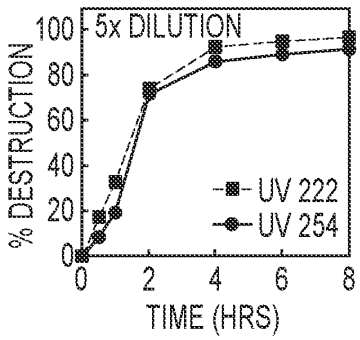


Figure 35b

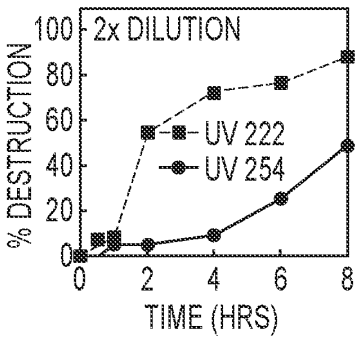


Figure 35c

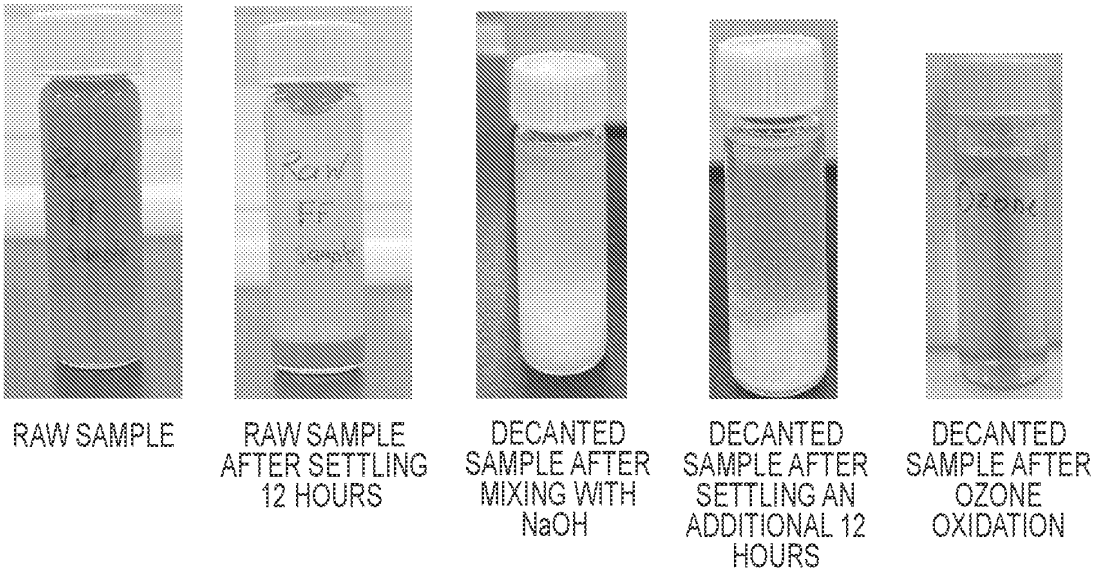


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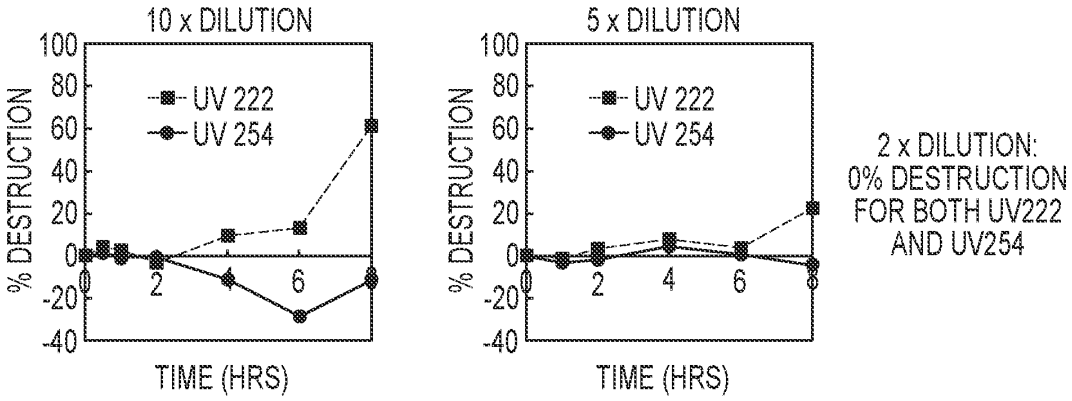


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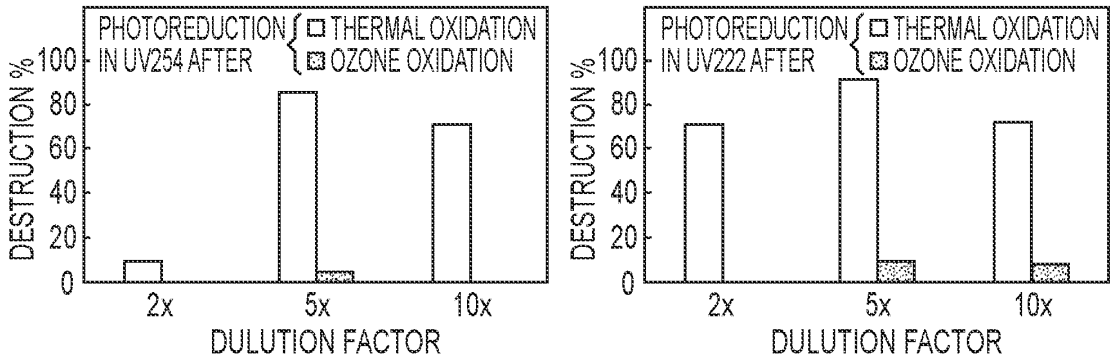


Figure 38

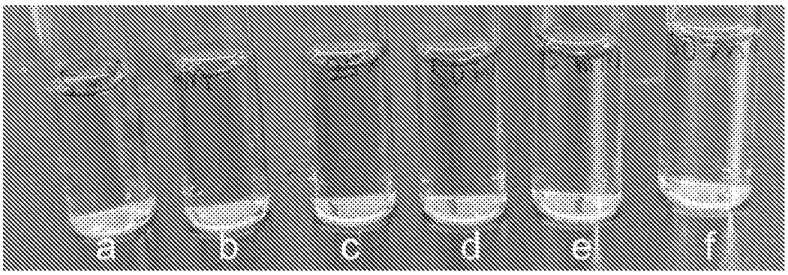


Figure 39

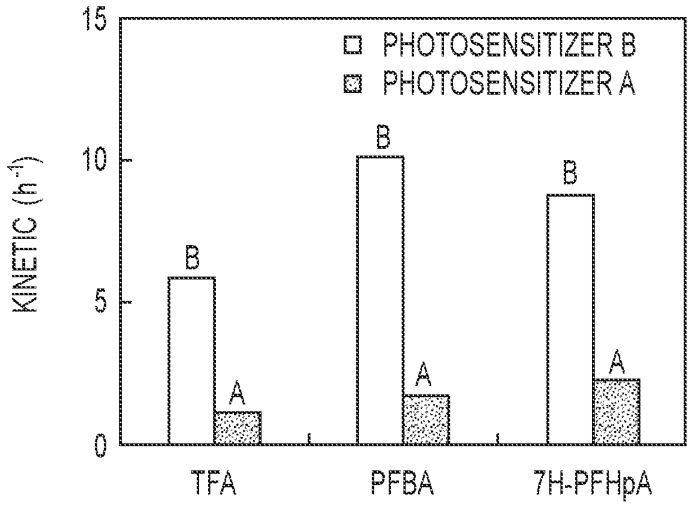


Figure 40

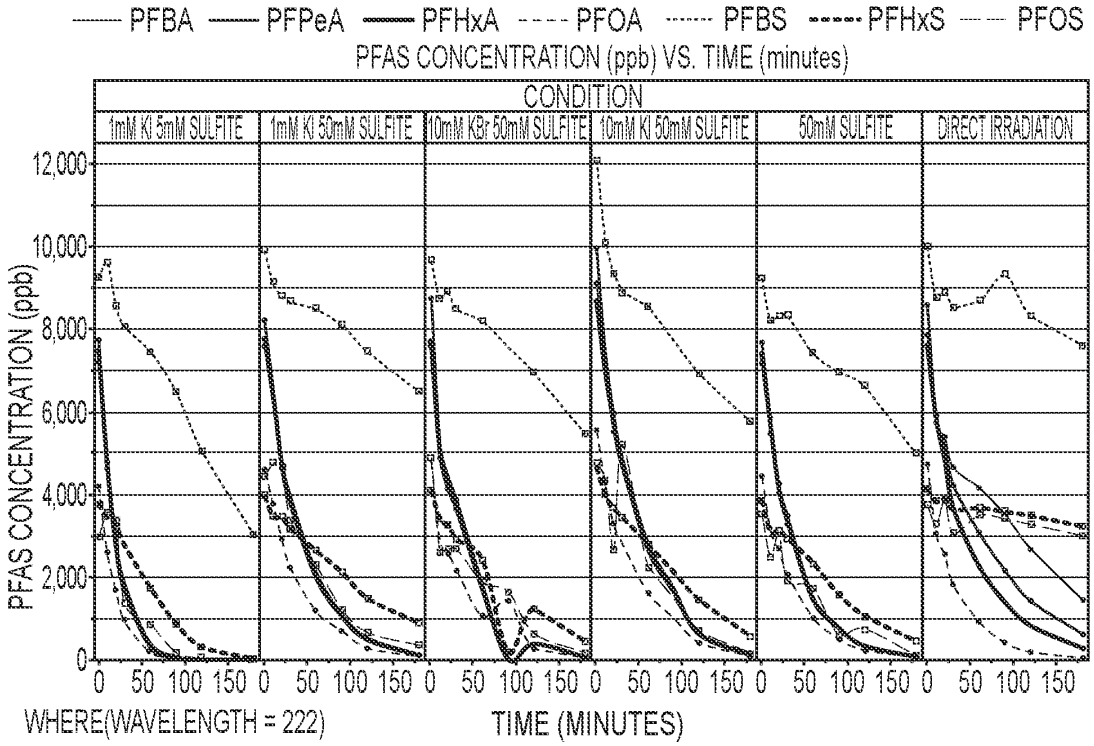


Figure 41

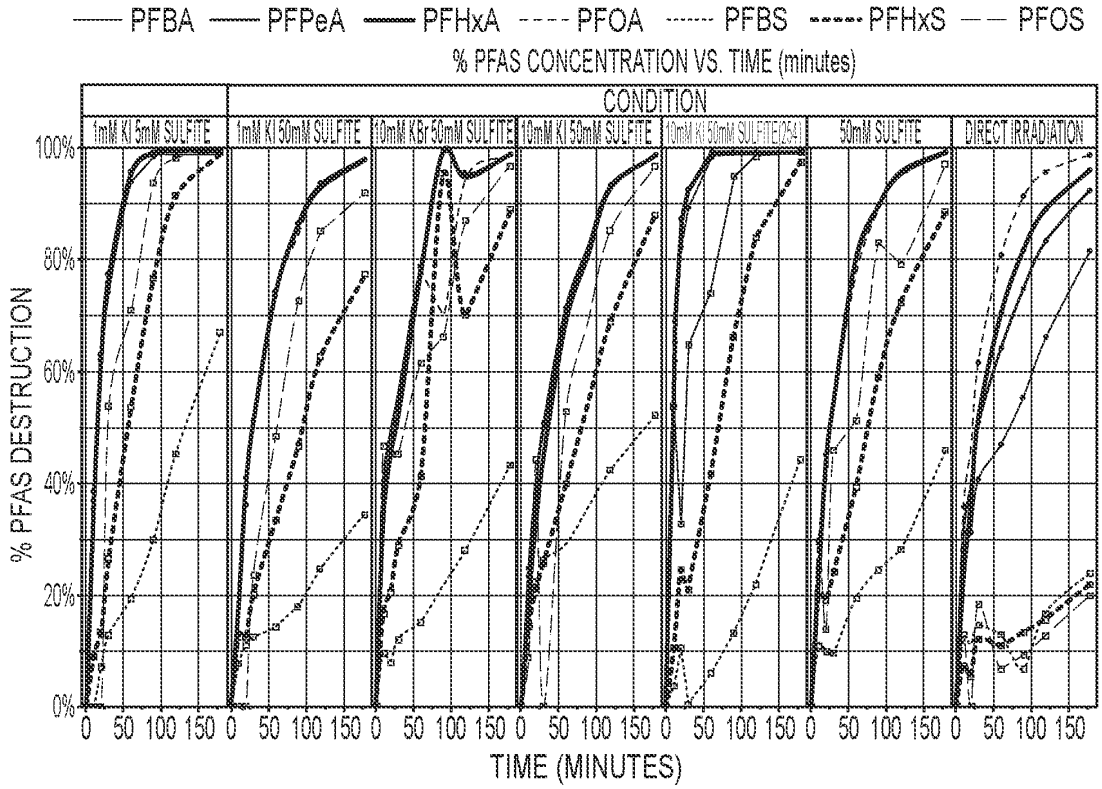


Figure 42

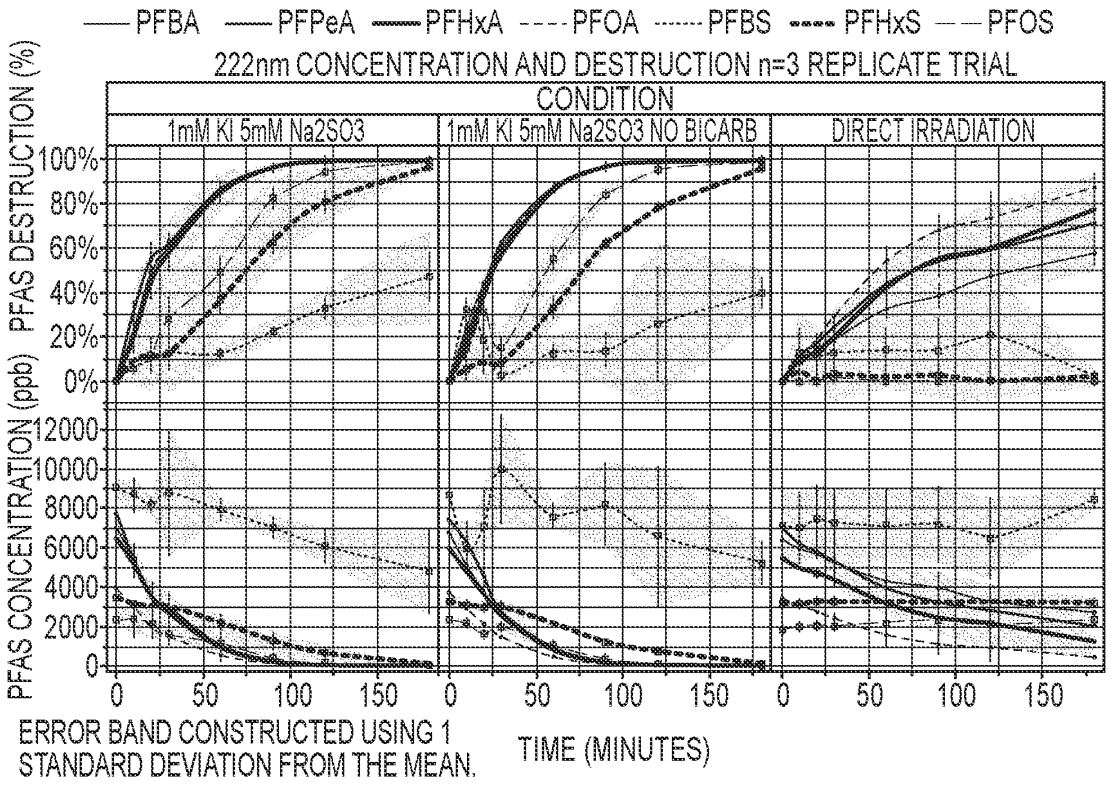


Figure 43

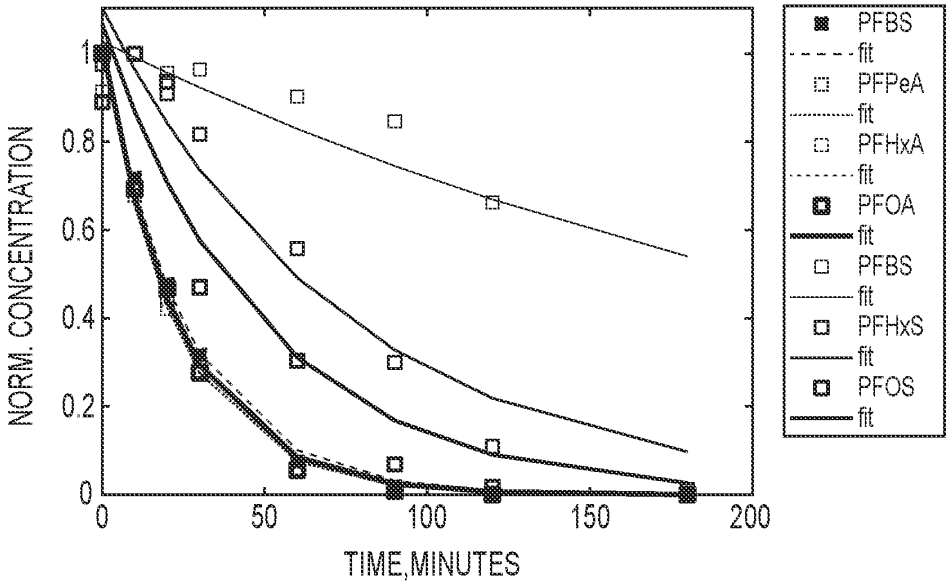


Figure 44

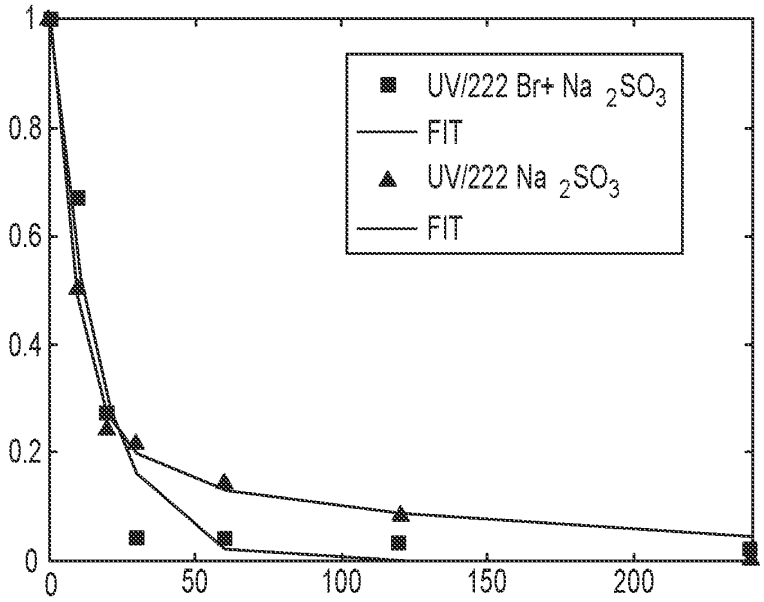


Figure 45

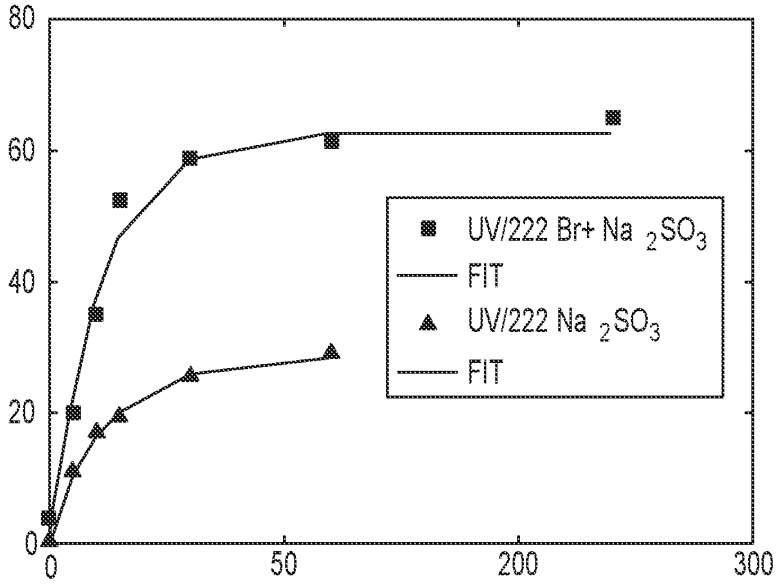


Figure 46

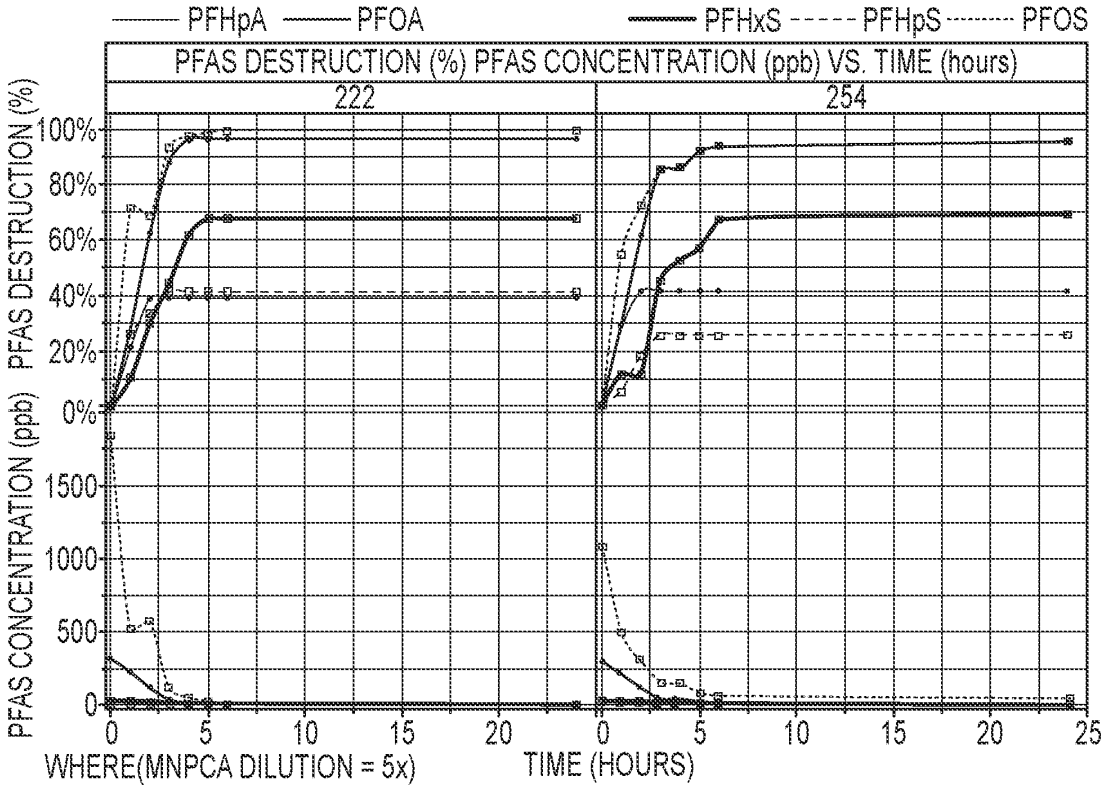


Figure 47

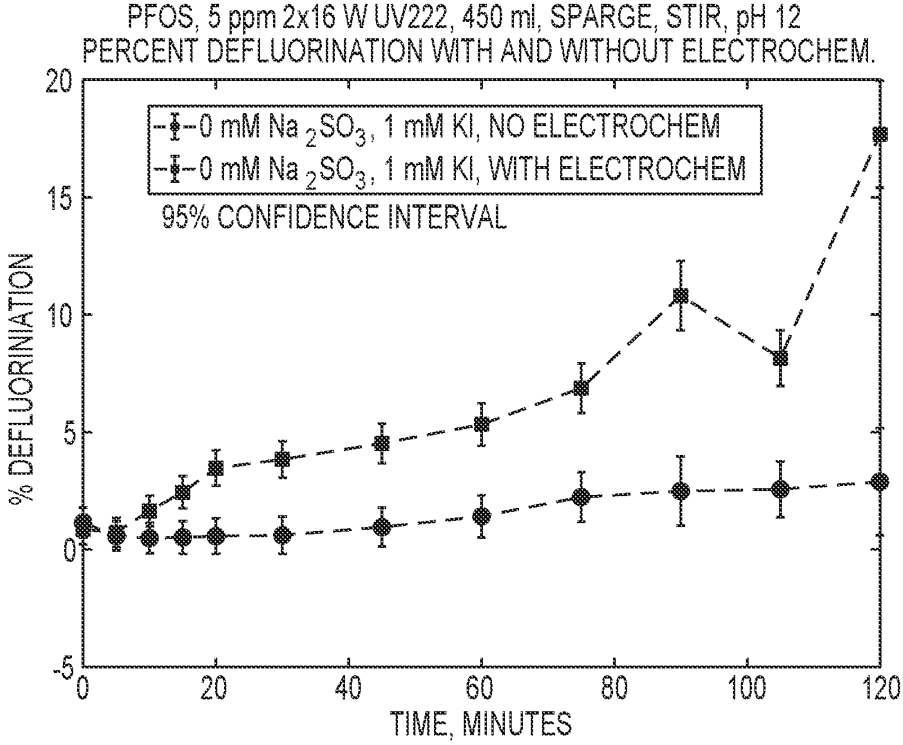


Figure 48

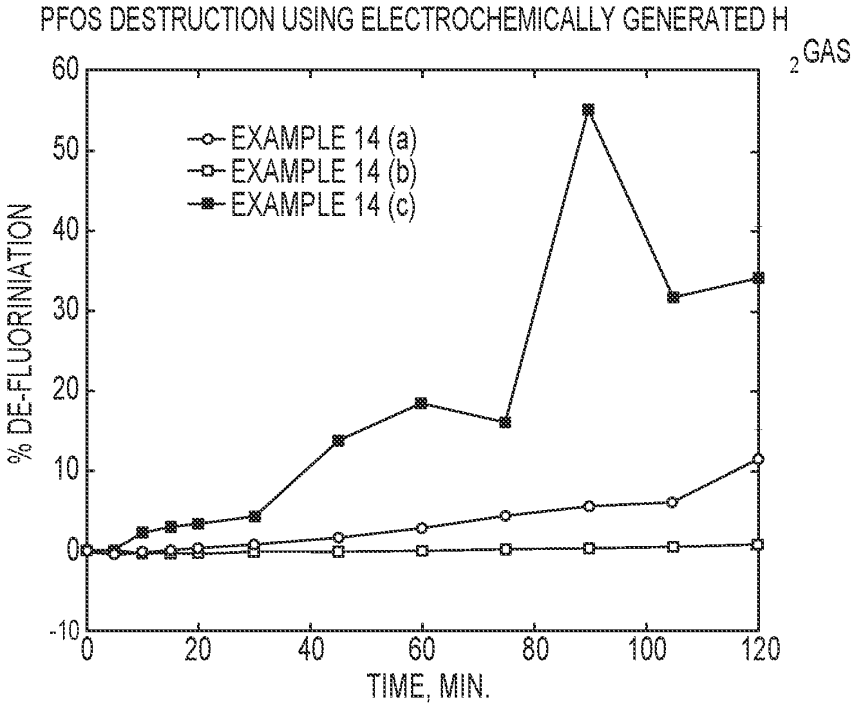


Figure 49

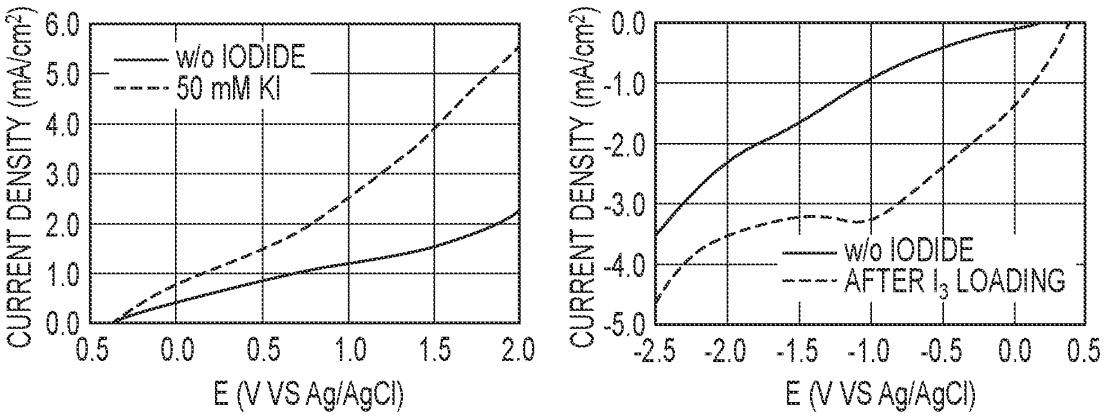


Figure 50

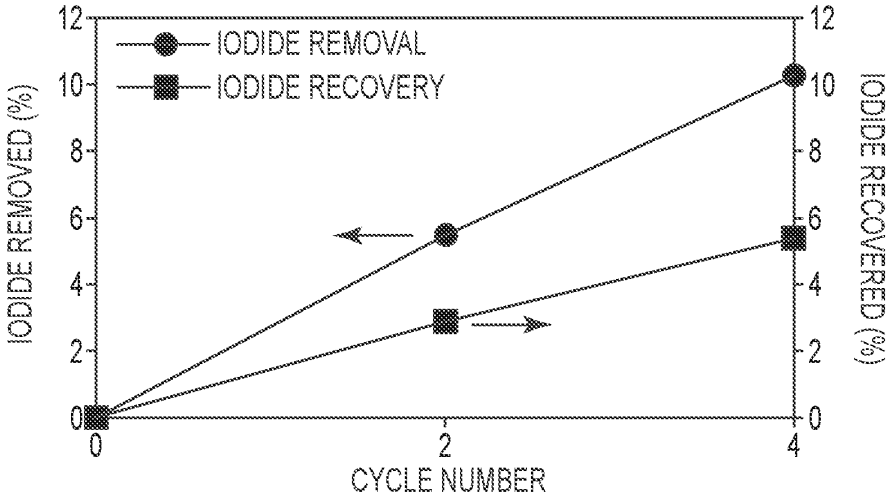


Figure 51

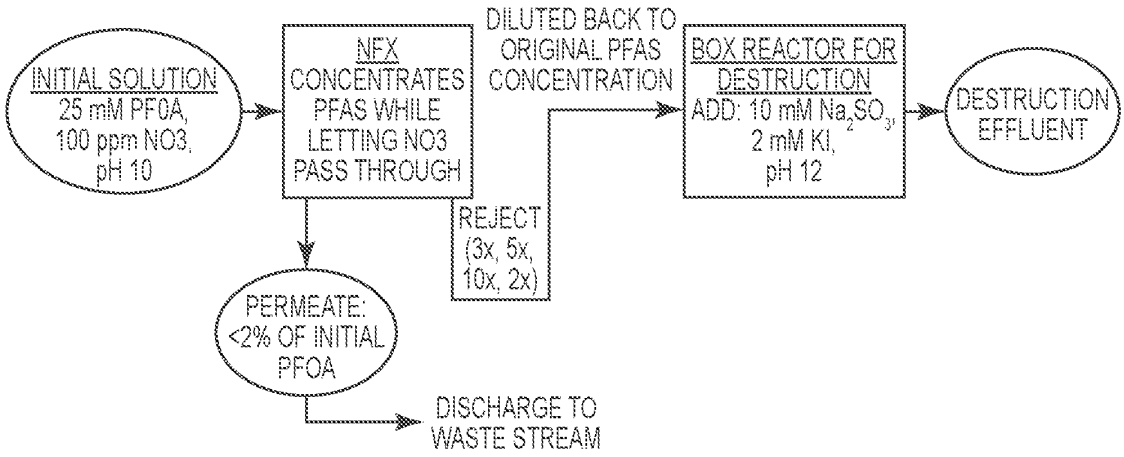


Figure 52

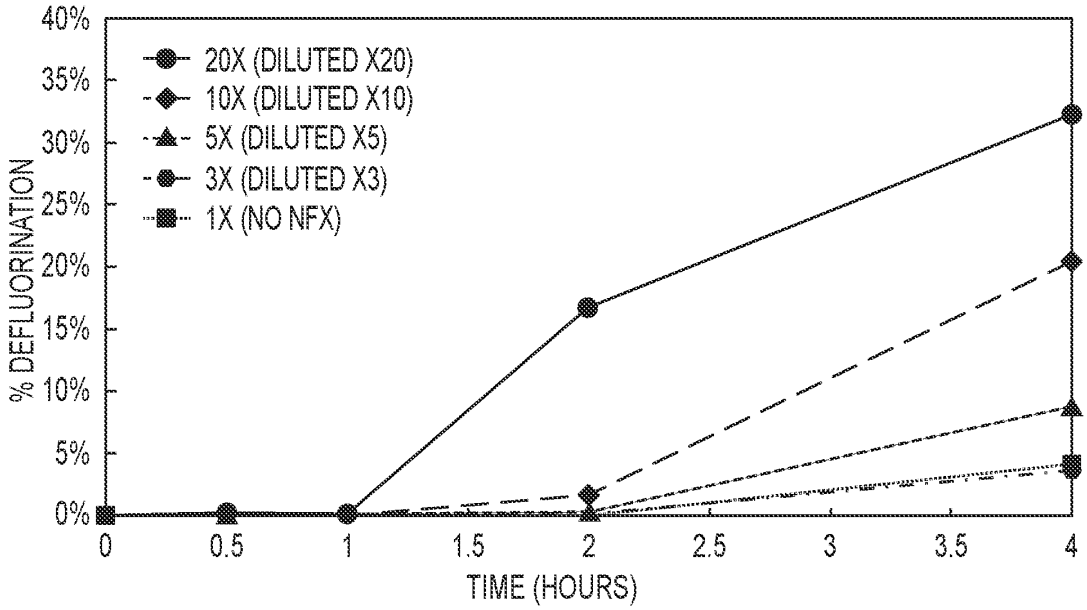


Figure 53

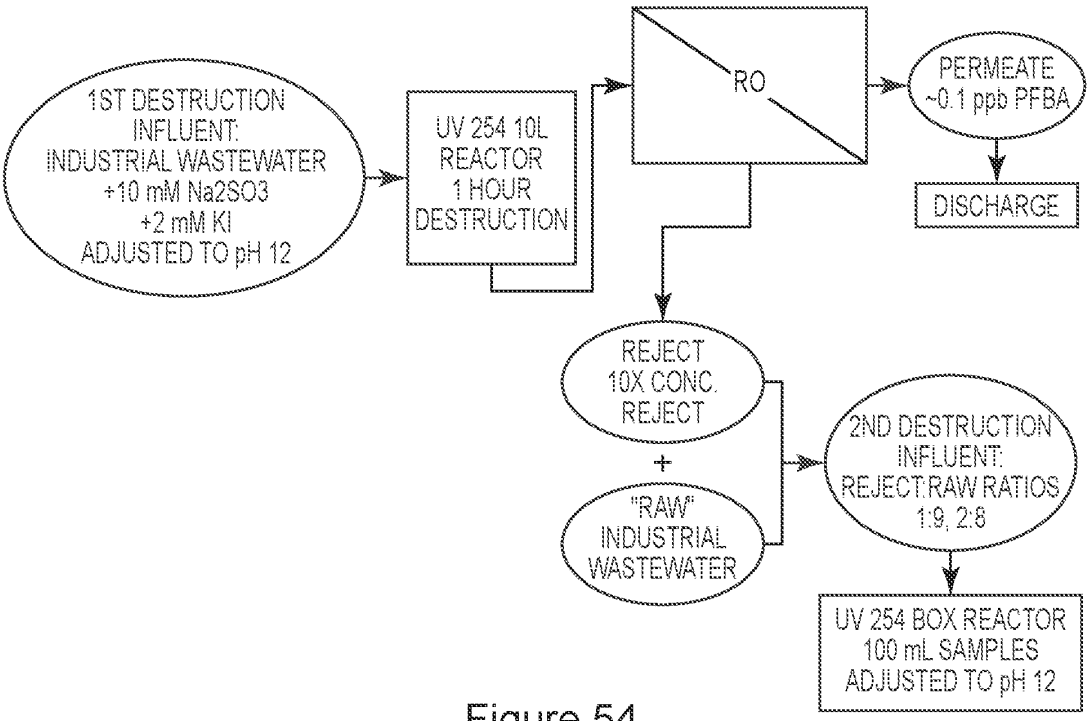


Figure 54

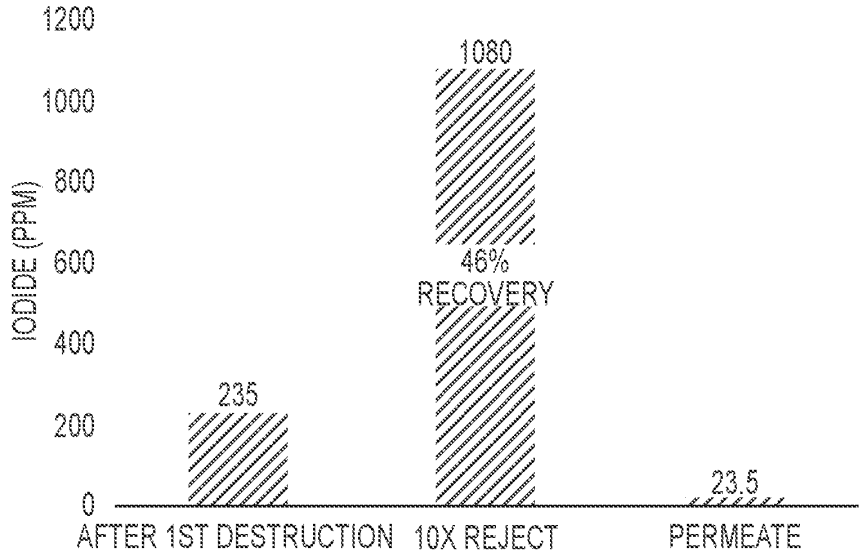


Figure 55

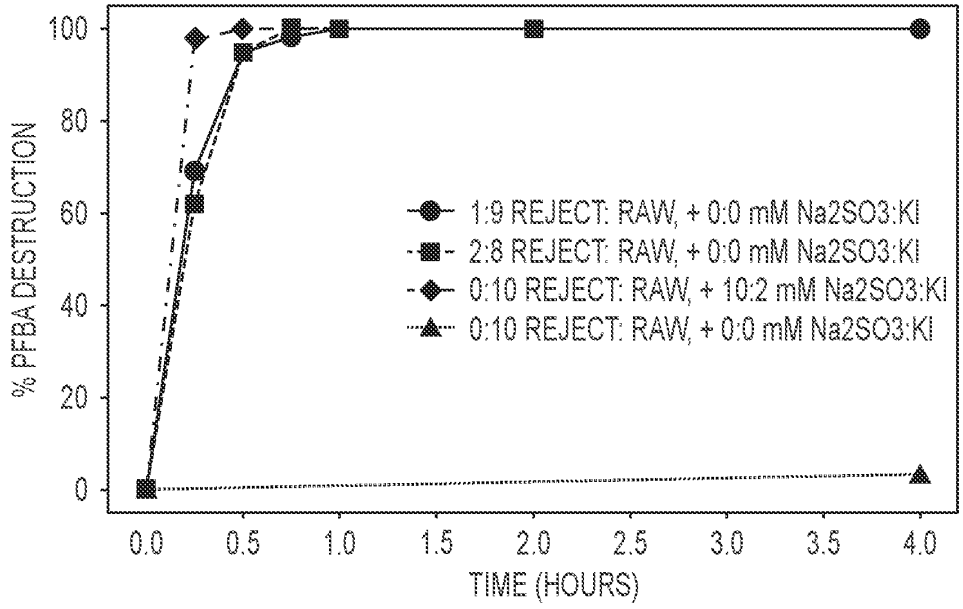


Figure 56

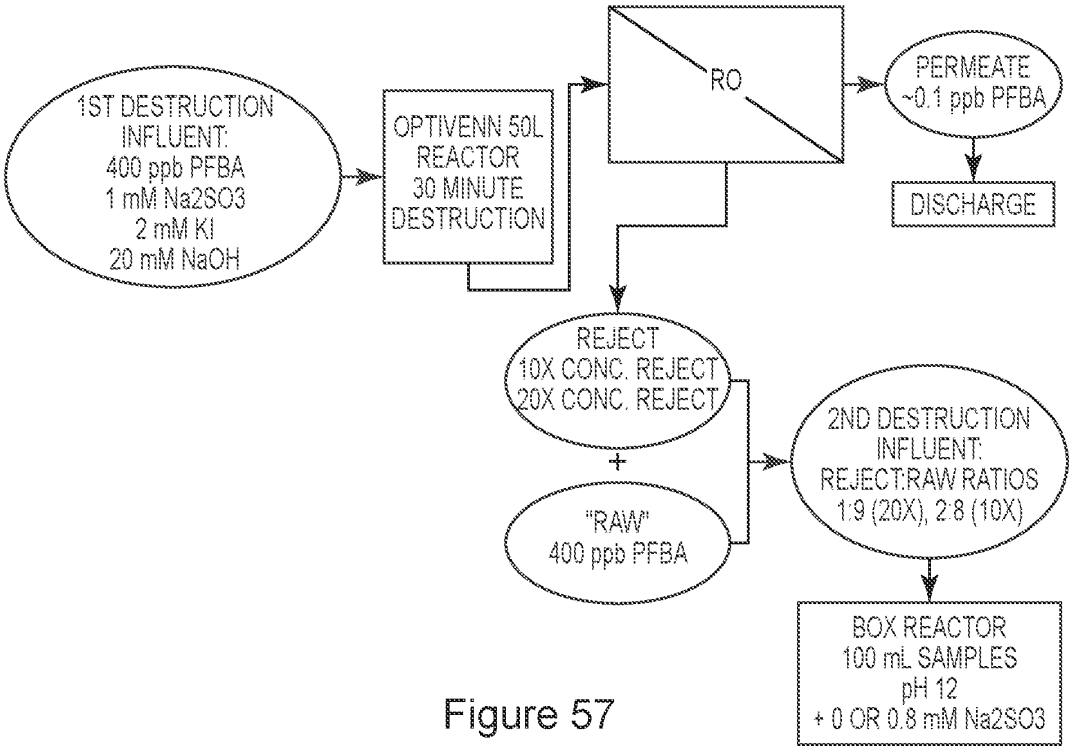


Figure 57

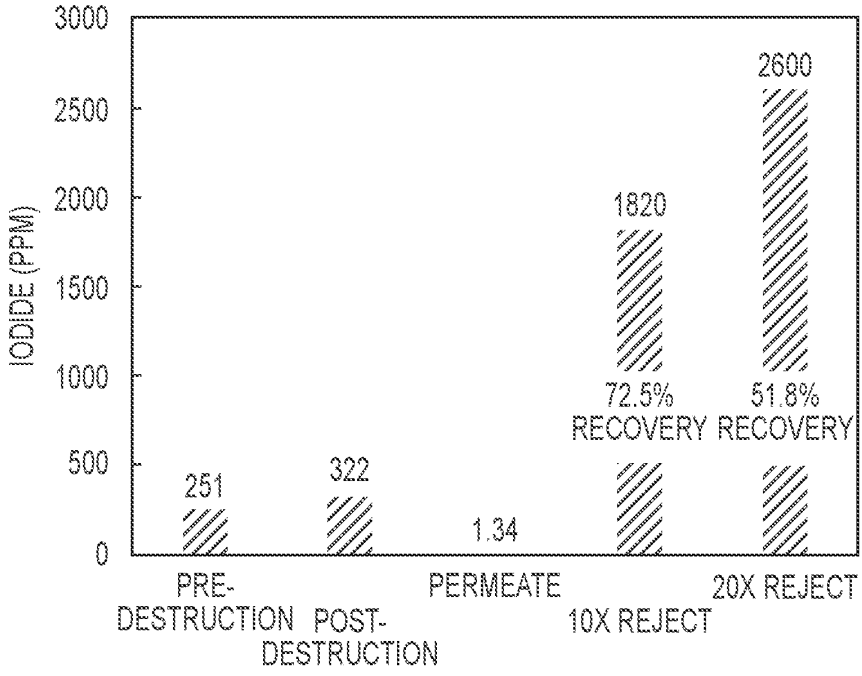


Figure 58

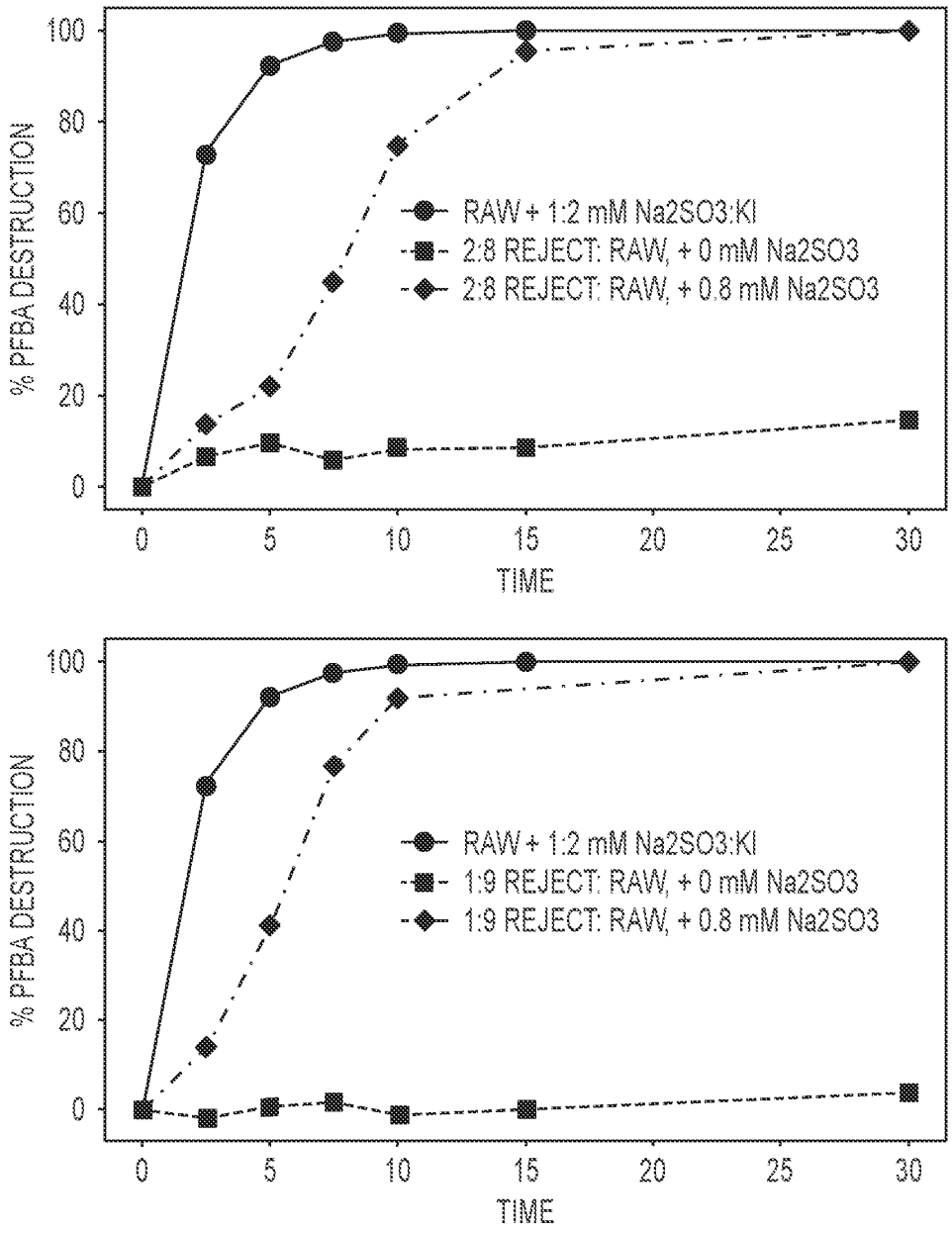

% PFBA DESTRUCTION
100
80
60
40
20
0
0
5
10
15
20
25
30
TIME
RAW + 1:2 mM Na2SO3:KI
2:8 REJECT: RAW, + 0 mM Na2SO3
2:8 REJECT: RAW, + 0.8 mM Na2SO3
% PFBA DESTRUCTION
100
80
60
40
20
0
0
5
10
15
20
25
30
TIME
RAW + 1:2 mM Na2SO3:KI
1:9 REJECT: RAW, + 0 mM Na2SO3
1:9 REJECT: RAW, + 0.8 mM Na2SO3

Figure 59